Gas Journal

VOL. 304 112th YEAR LONDON, DECEMBER 7, 1960 No. 5075 PRICE 1/6

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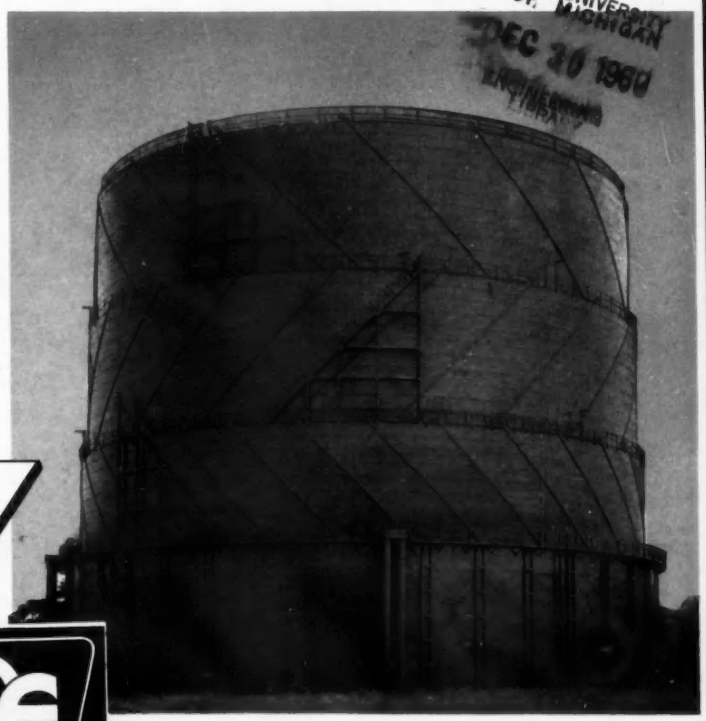

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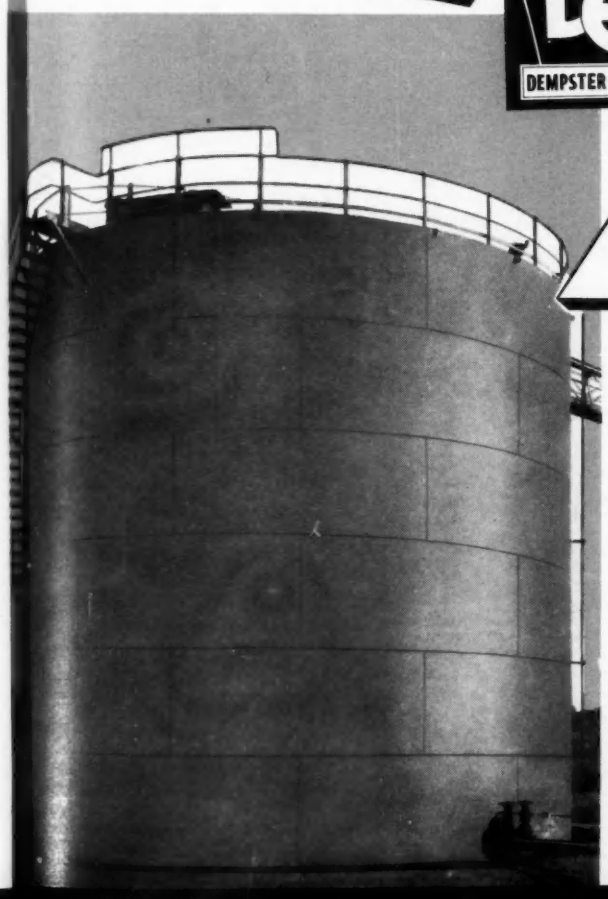

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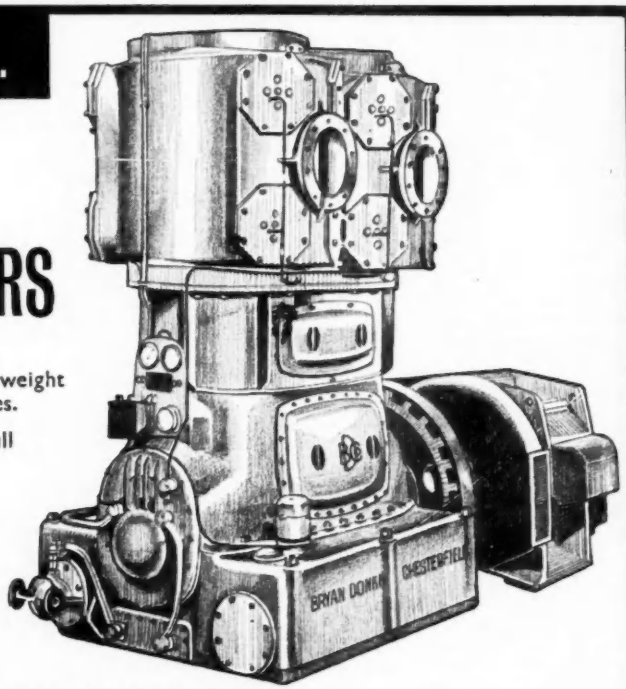

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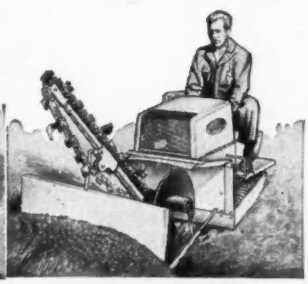

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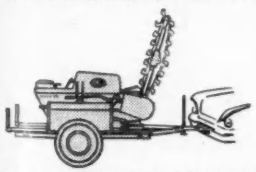

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Gas Journal

VOLUME 304 • NUMBER 5075 • 112th YEAR

WEDNESDAY DECEMBER 7, 1960

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Publishers' Notice, See Page 374, November 23, 1960

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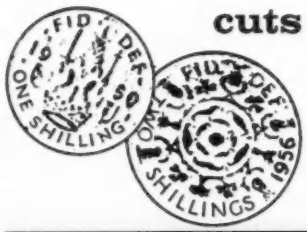

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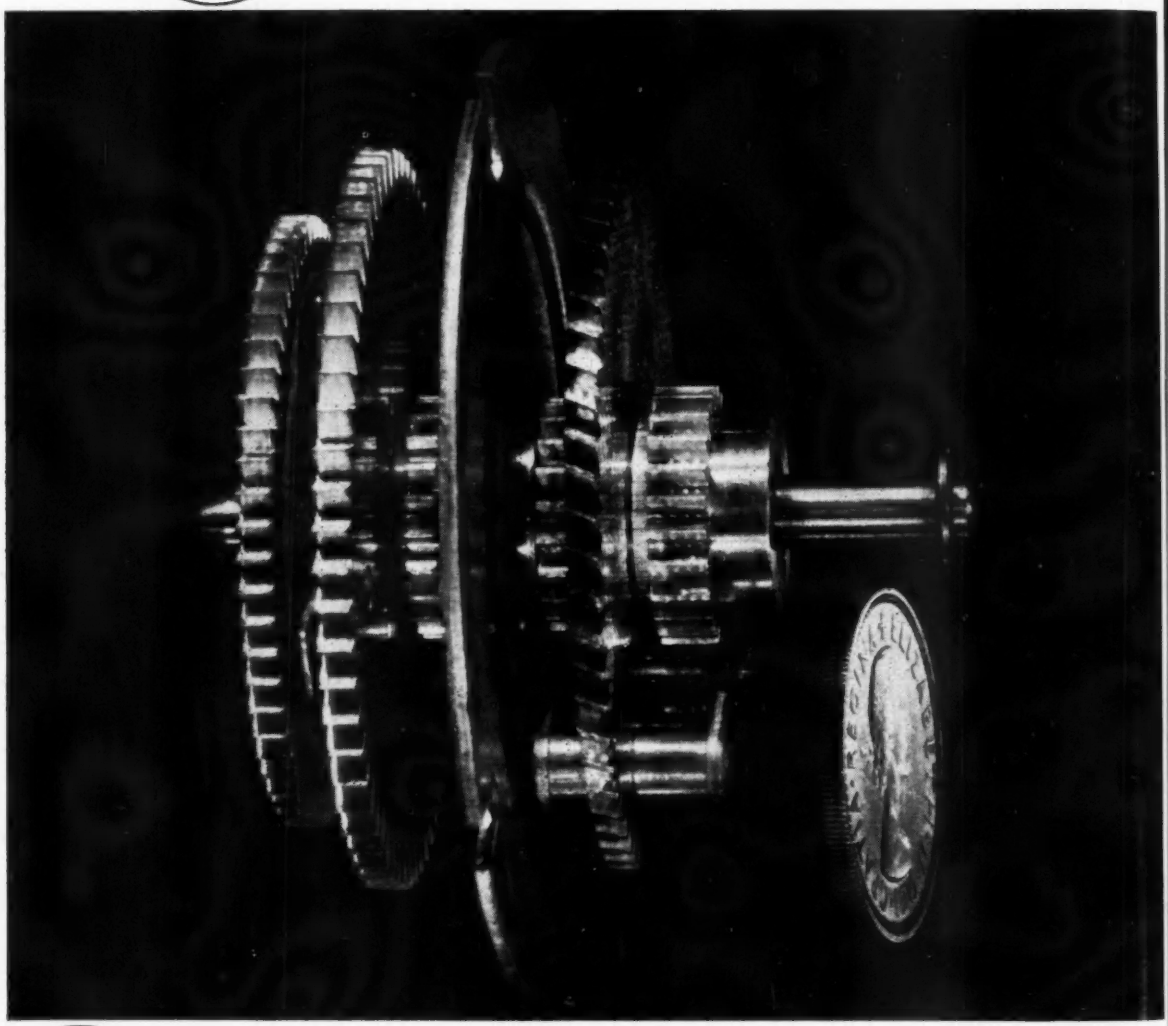

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Gas Journal

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The Minister replies to the N.U.M.

THE attitude of the National Union of Mineworkers towards a national fuel policy and possible financial help in some form from the Government was made clear at a Press conference the Union held last week for industrial correspondents.

Early last month a deputation from the Union met the Minister of Power; it put forward certain points in a memorandum and requested an answer in writing. The Minister's reply to the memorandum was the subject of the Press conference.

The points made by the Union cover certain ground now familiar to those interested in fuel matters, who by now, even after much patient study of the subject, have become confused by the many conflicting forecasts of fuel needs to be expected within the next five or ten years.

There can be little doubt that the steadily decreasing quantities of energy which are confidently put forward in these forecasts by the experts as being relevant in the light of the latest knowledge and technical efficiency, may well cause gloom among those trying to keep the coal industry's manpower in good heart. This and the ever-increasing inroads made into coal markets by oil, are clearly the most serious causes of alarm among many in the coal industry.

There is no doubt whatsoever that the rise in oil consumption by industry in general is little short of phenomenal, there having been a displacement of solid fuel by 16½ mill. tons in 1956, 31 mill. tons in 1959, and a predicted total of some 40 mill. tons for 1960. This whole question must be carefully examined, and we must ask ourselves what would have happened if the oil refining industry had not been allowed to expand in this country after the war.

Industry would not only have still been short of energy, and so all the slower in recovering, but the National Coal Board might well have had to stand even greater losses by the import of expensive, unsuitable coal from abroad. The establishing of large refineries in Britain has not only made available adequate supplies of easily handled fuel, but has also by the export of refinery products, eased a possible balance of payments difficulty.

The Union and others interested in coal utilisation are generally prepared to admit that any great increase in fuel usage would have to be found from oil, and so it would appear that the maximum quantity of coal available for home consumption must be something over 200 mill. tons. The total energy needs in 1965, the Union thinks, are likely to be nearer 280 mill. tons coal equivalent than the 300 mill. tons on which the N.C.B. is basing its calculations. Of this, the contribution by oil is likely to exceed 90 mill. tons, leaving a mere 180 mill. tons or so to be found by coal. The Union in fact considers the 200 mill. ton coal sales target unrealistic and out of the industry's reach.

The Minister, however, in his written reply considers these estimates by the Union as far too pessimistic, and points out that during the current year there has been an increase of 16 mill. tons coal equivalent in energy consumption. He is confident that the target of 300 mill. tons coal equivalent will be reached in the later 1960's.

The next point dealt with by the Union is the falling manpower in the industry. This clearly might be extremely serious, especially when those leaving the industry were in their early 30's, but here again the Minister stresses that it has been a matter of deliberate policy by stopping recruitment when it became necessary to shut down old, high-cost pits as up-to-date, fully mechanised collieries came into commission.

It is most important, however, to remember that such a policy must not be followed for a moment longer than is necessary, if morale in the industry is not to fall and so hinder the recruitment of promising young men. Naturally the Union is afraid of this, but the Minister makes it plain that once the original object had been fulfilled, recruiting was resumed and the loss of manpower greatly reduced.

The financial state of the coal industry continues to cause anxiety, and here once again the Union complain that the Government's control of coal prices in the years directly after nationalisation were fatal to the N.C.B.'s financial solvency.

It holds the view that if the Board had been allowed to charge an extra £1 a ton for all its qualities of coal, it would have accumulated substantial financial reserves; in fact the Union considers that outside industry has been subsidised indirectly to the equivalent of £2,000 mill.

The Minister's point is that the effect of higher coal prices in the early years after the war would have

made industry's task even more difficult in the export markets, as well as being greatly resented by the public at large.

This particular point we find difficult to accept, but we realise that, as so often happens, serious conditions, internationally important for the country, can influence the taking of a decision which might appear incomprehensible to anyone carrying on business in the ordinary way. It has been clear from the first, however, that lack of financial resources was not going to be allowed to interfere with technical developments in the mines. On this latter point, the Minister stresses that the loans made to the Board were at far more favourable rates of interest than would have been obtainable from the open market.

The other financial sores—the paying of compensation to the former owners, the loss incurred in importing coal, and the cost of stocking large tonnages last year—continue to worry the Union, but the Minister deals with them quite fairly. The profits from exports more than cancel out the loss from imports; the compensation values were determined independently as fair and just in 1947, and if coal had not been stocked, the labour force might well have had to be run down even more drastically.

The recommendations made by the Union to help the industry can be roughly divided into three categories: Financial help; the provision of other industries in declining mining areas; and the encouragement of the gas and electricity industries to use more coal, together with a reduction in oil imports.

Replying to the first two, the Minister shows that in actual fact a good deal is being done on these lines by declaring development districts in areas where collieries are being closed. The electricity boards have cut their oil conversion programme by nearly half, and the gas industry always consults the N.C.B. before installing any major plant which will not rely on coal for gasmaking.

We consider this exchange of ideas to be of the utmost value. It has ventilated the Union's complaints and given the Minister an excellent opportunity of putting forward the Government's views. That this exchange does not show anything startlingly new might have been expected, but a final declaration by the Minister that the Government regarded the coal industry as the mainstay of the country's energy supplies, does at least reassure all concerned that the rehabilitation of the industry, though slow, will be kept in the forefront of the Ministry's development programme. Besides, developments in the gas industry may substantially assist in the greater utilisation of coal.

Commentary on the news

Only optimists at Eastbourne

IN spite of the deficit of the South Eastern Gas Board last year, there was no atmosphere of gloom at the Conference of Joint Consultative Committees which was held at Eastbourne last week. The meeting began with a speech by the Mayor of Eastbourne, Alderman Miss G. L. Parker, M.B.E., who praised gas, especially for catering, with such enthusiasm that one felt she would be invaluable in the industry's public relations department.

The Chairman, Mr. R. N. Bruce, accounted for the deficit, but did not try to gloss over its severity; neither did he show the least pessimism for the future. He was convinced that when integration was even further achieved, the new plants would more than pay their way. He stressed the need for increased effort in selling gas, and in reducing costs.

Mr. Bruce said that he thought it extremely unlikely that they would break even in the current year. This strengthened his view that it would need their maximum efforts in a number of directions to keep that deficit as low as possible. These directions he enumerated as being to continue to persuade the public that they offered a good service, selling as many appliances as they could, reducing unnecessary expenditure, and keeping production plants to the highest pitch of efficiency.

It was this determination that was the most encouraging feature of the conference. It would have been too easy to despair at the prospect of another deficit next year.

Tributes were paid to the committee's work in broadening consultation between workers and management. Mr. P. C. McNally, the Divisional Organiser of the Amalgamated Engineering Union, spoke of this work in relation to the spread of automation, a field in which his union has always held very strong opinions. He said that where they had had joint consultation before automation had been introduced, many of the problems had been ironed out. In welcoming progress, they had to make sure that people did not suffer in that progress.

The feeling that collective bargaining was only a start was expressed by Mr. J. Cooper, Chairman of the Trades Union Side of the South Eastern Area Gas Industrial Council. Presumably he saw joint consultation as the next logical step, although how effective collective bargaining would be without consultation is questionable. This aside, he expressed his appreciation of the work the joint consultative committees perform in the gas industry.

It would appear that they do indeed play a vital part in its successful operation by keeping it as free as is possible from internecine warfare.

Bad publicity

AS an industry gas continues to be somewhat sensitive about the press it receives, and although the chip on the shoulder attitude sometimes encountered is certainly unjustified, it must be admitted that on occasion our fuel is shown in a pretty unfavourable light. With the death (from accidental gassing) roll of close on 800 (in 1958, the latest figures available) it would be strange if gas escaped an occasional thrust, and articles such as that published in *The People* on November 20, unpleasant though they are, must be expected from time to time.

On this occasion a six-column headline screamed 'Gas Peril in the Home,' the writer, Gordon Beverley, advocating the adoption of a certain make of pressure cut-off for use with a prepayment meter to 'end the fears of mothers everywhere.' In fact the adoption of the device, which might be expected to save about five lives a year, would cost the industry £15-£20 mill. This is one of the occasions on which the Press might usefully have employed a sense of proportion.

SYDNEY

Australian Gas Industry Convention

MR. N. G. MATHER, President, 'gazed into the crystal globe and indulged in predictions for the future,' under the two headings 'People,' very briefly, and 'Hydrocarbons,' surveying the world fuel situation in the past, present, and particularly the future, at considerable length with a wealth of maps and graphs.

As to 'People,' he thought few would disagree that living standards throughout the world would continue to accelerate during the rest of this century and that, as a corollary, *per capita* use of fuel would similary accelerate.

Hydrocarbons, solid, liquid or gaseous, might be used as fixed fuels or portable fuels. The gas industry was a fixed fuel industry associated with agglomerations of population. The oil industry could be a fixed fuel industry but portable usage was of more significance in national economies. These two great industries were in the middle of a process of integration; their merger would probably be complete by the end of this century. He did not think that nuclear fuel would displace portable hydrocarbon fuels in the future. He thought the tremendous needs of civilisation in the next century would be sustained by fixed and portable hydrocarbon fuels from natural sources.

Hydrocarbons

The President proceeded to examine the 20th century exploitation of the natural deposits of hydrocarbons. He dealt first with the world's known oil deposits, indicating the overriding importance of those in the Middle East. Present trends in the production of crude oil indicated a world total of 1,400 mill. metric tonnes by 1970 which could be 3,000 mill. tonnes by the year 2000, *i.e.*, three times what it is today. United Nations statistics indicate that since 1956 the rate of increase in proved world oil reserves had flattened off. The total appears to be approaching a maximum of 40,000 mill. tonnes which might start decreasing during the 1960s. Related to the increase in population, one of the President's graphs indicates that by the year 2000, proved oil reserves may recede below those of 1920. Man might be compelled to find the answer to synthetic production of all classes of oil products within the next 40 years. Admitting the present importance of natural gas, particularly in America, he thought it might be possible that its significance to the Western Nations could be greatly diminished by the end of this century.

It remained to consider where the problems which may confront the oil and natural gas industries within the next 40 years might find a solution. Coal, oil and natural gas all derive from geological accumulations of various plants (? organisms). Man's use of hydrocarbons disperses most of them back to the atmosphere as CO_2. Plants extract carbon from this atmospheric CO_2 and also return CO_2 to the atmosphere, the percentage therein remaining approximately constant. It is estimated that one-thirty-fifth of the atmospheric CO_2 is thus annually turned over, representing a total of about 20,000 mill. tons of carbon. It needed many years of the right geological climate for the original deposition and after that, many years of geological deposition to ensure the pressure and heat to turn these accumulations into coal, oil and natural gas.

It would appear that the most logical means of bridging the gap between the probable depletion of the world's readily accessible oil and natural gas reserves and current world consumption, until direct synthesis from atmospheric CO_2 could cater for full requirements, will be hydrogenation of the world's coal reserves. These coal reserves cannot be inexhaustible but current anticipation was that they would at least last for 500 years.

Sooner or later problems of international magnitude would be posed requiring a concentrated and co-ordinated effort by many people. What industry is better placed to lead than the gas industry?

Place of oil, gas

Mr. J. W. Bell, of the Atlantic Union Oil Company, surveyed the place of oil and gas in the Australian energy field. Australia, he said, was now the fourth largest oil consumer in the free world on a per capita basis. The search for oil in Australia had been unsuccessful but it continued unabated.

Australia's energy demand was now nearly double the 1945-46 consumption and a further increase of 50% was predicted by the end of this decade. Solid fuels had all lost ground to liquid energy in terms of share of total demand. Black coal, while slipping from a 53% share in 1945-46 to 45% in 1957-58, was, however, sold in much greater quantities, nearly 19 mill. tons against 12.4 mill. in 1945-46. Petroleum had risen from 17% in 1946 to 32% in 1959; by 1970 oil was anticipated to provide 36% of the total. Oil was expected to provide half the world demand for energy by 1970.

Hydro-electricity, mainly as a result of the Snowy Mountains project, is already supplying 4% of Australia's energy and 9% is predicted for 1970. Wood and bagasse are diminishing in importance to 7% by 1970.

Causes of the overall increase in demand are the 25% increase in population coupled with vastly improved living standards, and the concurrent expansion of the electricity, gas and iron and steel industries. Brown coal and petroleum account for more than 25% of the town gas produced in Australia. Mr. Bell's final chart showed the staggering growth in transport since the war. Australian railways are rapidly converting to diesel locomotives.

Petroleum products

Mr. Bell then turned to the future of petroleum products in relation to the gas industry. Fuel oil was the most important residual in oil refining. Greater quantities of this were becoming available with the expansion of the refining industry and at increasingly attractive prices. The gas industry was already producing gas from fuel oil and further production is developing in Victoria. Liquefied petroleum gases, largely propane and butane, are being used for direct domestic supply and also for enrichment. Natural gas was expected to supply 15% of the world's total energy requirements by 1970.

Mr. Bell discussed its availability at oil and gas wells in undeveloped and isolated economies and the possibilities of transporting it to centres of consumption with particular reference to the Methane Pioneer, and added: 'Liquid methane has a very exciting future.'

Looking ahead one could see the emergence of nuclear and solar power to satisfy the ever-increasing demands of mankind for energy but in the immediate future these would be met by coal, oil, natural gas and hydro-electricity and even when some other more economical or more efficient form of energy becomes available the increase in world demand would be such as to guarantee expanding markets for conventional fuels.

Mr. R. G. Trevillian dealt with 'Planning for increased appliance sales.' Sales force development is discussed under the three headings, recruiting, training and remuneration. Increased sales volume could only be reached with an effective sales group. A positive approach has been made by those companies which have formulated recruiting plans forecasting sales staff requirements for one, three and in some instances five years in advance, placing recruits in positions within the organisation where sales background can be assimilated and basic training obtained.

Remuneration

Given an adequate staff, training can be applied which superimposes all the latest techniques on the standard practice of class-room training, field instruction and refresher courses, the last particularly for senior salesmen. Remuneration was a controversial question. Reward should be materially governed by the individual results achieved. He advocated 'Remunerate adequately, without delay.'

The importance of market research is emphasised. This should be continuous. Technical advances, especially in the design of domestic appliances, are compared, in some cases unfavourably, with those in other countries.

Advertising must enhance and uplift the prestige of the industry and produce locally, through the various media, a continuous flow of prospects. Australians regard the American way of life as the ultimate in good living standards and the Australian public must be told of the successes of gas appliances in America—the overwhelming preference of the American public is for gas cooking. 'Planned advertising, when fitted into general marketing strategy, is an investment not a sales expense.' Sales promotion literature should not be enclosed with the gas account. Direct mail and personal selling is more effective.

It becomes increasingly important that we provide the means for keeping our products and policies sensitively attuned to the rapid changes in the desires and buying habits of the public and by planning organising training and evaluation rise to meet this stirring challenge.

Digital computer

Mr. J. C. Challis and Mr. M. J. Williams, of the Australian Gas Light Co., Sydney, describe the network analyses of gas distribution system by electronic digital computer, in considerable detail.

Quoting the summary: 'The large investment required to extend and reinforce gas reticulation systems has intensified the need for proper engineering design of distribution facilities. This requires an accurate determination of flow distribution and pressures in the existing and proposed systems. The labour involved in this work is very long and tedious if manual techniques are employed. The adoption of automatic computer procedures has achieved improved accuracy, very greatly increased speed and consistency of results permitting large networks to be usefully investigated.'

Details are given in the paper of a computer technique which has been used by the Australian Gas Light Company employing a 1BM650 high speed general purpose digital computer.

The computer programme prepared by the authors provides for the computer to be supplied with the length, diameter, flow estimate and loop data of all pipes in the network to be considered. The programme on these bases is designed to give an exact solution to such problems as (a) the effect of additional demand on the existing system, (b) the effect of additional supply lines in any area, (c) the effect of inter-connecting existing mains, (d) the effect of temporarily removing from the system any pipes which require replacement, (e) the reduction of leakage losses by the determination of an optimum weighted mean pressure for the district. The programme is designed to accommodate 500 pipe sections in loops and 1,000 pipe sections in the whole network.

The preparation of the data and its reduction to a 'squared' network diagram are described with an example and samples of the punched cards are given. 'In a typical problem involving 150 pipes in loops and about 450 pipes in the entire system, the initial analysis took about 20 minutes. The addition of a small number of pipes to the network took only five minutes to obtain a new solution.'

'The use of a computer does not resolve all the difficulties connected with network analyses.' The preparation and gathering of information must be made with the same extreme care as when manual methods are employed. The programme outlined in the paper provides a simple, rapid and flexible method of high capacity for the analysis of gas networks—readily repeatable—'so that the distribution engineer can obtain a complete picture of the current status of the system.'

Complex process

Under the picturesque title 'Oracle,' Miss V. G. Steward describes a method of production scheduling of the complex gas-making process as in use at the Sydney Mortlake works of the Australian Gas Light Company where gas issued to consumers is made by mixing together a number of separately produced gases. To meet seasonal fluctuations in demand 'a gas-making schedule for a complete yearly cycle on a week-to-week basis is needed if optimum operation is to be achieved.'

The elements of the problem—that of sending out a mixed gas within satisfactory limits of combustion characteristics with due consideration of the production of saleable coke and other by-products—are set out in detail. Six gases are normally constituents of the gas mix.

1. Coal gas made in (continuous) vertical retorts fired by producer gas generated from coke.
2. C.w.g. made in plants which can produce blue water gas or carburetted gas, the ratio of which can be varied in the usual manner by varying the oiling rate up to 'a maximum of 15 gal. of oil per cycle.'
3. Flue gas, used in small quantities as a diluent.
4. Liquefied petroleum gas—purchased in a fixed volume per week—mostly sold as 'bottled gas' but used on the works as an enricher or as a fuel.
5. Paccal, another high calorific gas, purchased under weekly contract from a petro-chemical company.
6. Oil gas, made in three old manually operated c.w.g. sets, can be used in emergency and ignored in the calculations since its properties are very similar to those of the Paccal.

Combustion characteristics of the several gases are calculated from their specific gravities and calorific values

from which are derived the Wobbe index and the Delbourg combustion potential, the Delbourg interchangeability diagram being used to set the limits.

The problem of coke production seems to be limited to that of keeping movement in and out of stock to the minimum. Costs of the several raw materials together with the prices obtained from by-products must also be taken fully into account.

A detailed examination of the variables shows that the problem can be reduced to thermal requirements, coke requirements and the maintenance of a Delbourg combustion potential of 73.

'A programme has been written for the solution on our computer of this problem of scheduling. The necessary information about each week is drawn up and the programme calculates the composition of the gas mix, the coke situation and the make of by-products each week. Input and output to the computer is by punched cards—one card of data being read for each week.' An example is given and the solution of the problem is described.

Weekly plan

The basic use of the schedule is to give the operations group a weekly plan for operating Mortlake. It is also used by the accountants as a basis for budgeting. In addition to this, the *Oracle* programme has been used successfully to calculate quickly the effect of changes in operating procedure, particularly their effect on cost.

The works manager of the (Sydney) North Shore Gas Company, Mr. D. E. Radford, describes the very successful uses of low density, low iron content mixtures for gas purification. 'These experiments had their genesis when I visited Honolulu for the Mid-Pacific Gas Conference in February 1959. Basically, the Honolulu purification method consists of:—

1. The use of a very low density material, consisting of an active iron oxide deposited in a fine layer on the surface of water-saturated wood shavings, brought to a *p*H of 9 to 10 by the addition of sodium carbonate.
2. Rotation of purifiers at frequent intervals.
3. The use of a high gas velocity through the purifier mass.'

A number of papers had been published in rapid rotation on purifiers (R. J. S. Thomson, 'GAS JOURNAL,' January 1960, p. 146), but besides anticipating these by some years, the Honolulu people had gone a step further by introducing the very low density mixtures, making possible the high flow rates necessary to take full advantage of the increased reactivity resulting from rapid rotation.

High porosity

In Honolulu the mass is prepared by mixing finely powdered metallic iron with water-saturated wood shavings, 1½ lb. iron to 100 lb. of (dry) shavings with sodium carbonate to bring the *p*H to 9 to 10. The iron rapidly oxidises giving an extremely fine ferric oxide coating over the wood shavings, resulting in a purification mass of high porosity and a density of 4 to 14 lb. per cu.ft., the actual density depending largely on the type of shavings used.

This mass presents very little resistance to the flow of gas; gas velocities many times greater than those normally used may be obtained with very small pressure differentials—in fact the pressure drop across the oxide bed is negligible compared with that in the mains and valves.

The boxes at Honolulu are 18 ft. diameter by 12 ft. deep, three on stream in series, one standby. The gas flow (oil gas with an H_2S content of 480 grains per 100 cu.ft.) is 6 mill. cu.ft. per day. The depth of 'oxide' in each box is 8 ft. Linear flow velocity (calculated on the empty box) is 16.3 ft. per minute. The volume of gas purified per cu.ft. oxide per day is 980 cu.ft. The equivalent R ratio is 125, but it must be remembered that only three boxes are used in series. Contact time (calculated on the empty box) is 1.47 minutes. Details of the working are given.

'Remarkable results are obtained, the sulphur content of the spent oxide rising to very high figures. Normally the "oxides" contain up to 60% on first discharge and above 70% on second discharge. Oxides containing 79% have been returned to the boxes and have worked as well as ever'—calculated to a wood-free basis this is about 99% or 180 lb. S per lb. of Fe_2O_3 originally present in the mixture. It is suggested that the actual reactions occurring are similar to those in the Ferrox process of liquid purification (see Priestley, 'Gas World,' February 12, 1949). This theory is supported by the fact that when the *p*H of the mass falls below 8 the material becomes comparatively inactive while subsequent addition of sodium carbonate re-activates it.

It was decided to try to repeat the Honolulu results at North Shore with such materials as were locally available. 'C' set purifiers at Oyster Cove works was put on 24 hour rotation and Manly works purifiers on 12 hour rotation—the best attainable with available labour.

The conversion of a complete purification system to a new mixture takes a considerable time and after 18 months results are far from complete.

The first experiment was with burnt oxide cinder from the Monsanto acid factory—this being the purifying material most readily available at Sydney. One volume of burnt oxide was added to ten volumes of wood shaving with the maximum possible water and sufficient sodium carbonate to give *p*H between 9 and 10. The 10% by volume of burnt oxide, though considerably higher than the proportion used at Honolulu, appeared to be necessary to cover the surface of the shavings leaving no 'free' oxide to fill the interstices of the shavings. This material was loaded into box 2C at Oyster Cove to a depth of 48 in., 4,800 cu.ft. in the 40-ft. by 30-ft. box.

Results set out

The results are set out in the paper. In general at the end of the 24-hour period, the H_2S content of the gas was reduced to between 40 and 75 grains per 100 cu.ft. at the outlet of the first taker and purification was complete in the second box. Back pressure across each box was of the order of .4 in. w.g. loaded and after five to six months exposure had risen only to .5 in.

Attempts were also made with corroding scrap iron borings on wood shavings. Results are also given with 12-hour rotation at Manly. All the results are tabulated and set out in graphs.

In another paper on purification Mr. B. B. Bennett and Mr. J. G. Baker of Melbourne discuss the economic aspects of removing organic sulphur.

Mr. P. L. Spedding of the Australian Gas Light Company, Sydney, discusses the effect on town gas of oil washing in the gas purification process at the Mortlake Works.

The bulk of the paper is devoted to light oil recovery.

The effects of oil-washing and those of plant changes are set out in detail in the paper together with a short note on naphthalene removal in a mechanical washer.

Among the advantages of oil washing, set out in the author's conclusions, he says 'the organic sulphur content of the gas can be reduced between 35 and 55% under normal operational conditions, but with higher scrubbing pressures and reasonable scrubbing temperatures, the reduction of organic sulphur can be as high as 75%.

GAS on the CONTINENT

Cathodic protection for gas mains

THE 12-in. diameter gas main from Saratov to Moscow was laid in 1944 and 1945 over a distance of 510 miles at a depth between 7 ft. and 7 ft. 6 in. in ground of varying corrosiveness. When laid it was protected by bitumen insulation but inspection in 1947 revealed considerable damage caused by intensive corrosion, and by 1951 the wall thickness had been eaten away in many places. The decision to introduce cathodic protection was made in 1952.

Experience has shown that cathodic protection with selenium rectifiers gives the highest degree of reliability, particularly when fed from the public electricity supply system. Wind generators were found to be less reliable and their batteries often ran down.

In isolated areas, special transmission lines for 10,600 and 400 V. were erected which were cheaper than to build small generator stations distributed along the line.

The success of cathodic protection in this section is expected to lead to its application on other long distance gas mains *e.g.* from Kiev to Moscow and from Stavropol to Moscow. *E. A. Nikitenko and V. V. Krasnojarski. Gazovaja Promyshlennost* (Gas Industry), May, 1960, **5**, 37.

Errors in gas meters

OVERALL gas losses can be determined fairly easily by deducting the amount of gas consumed by the customers from the amount delivered into the gas distribution system. The most important element from the safety angle is the gas leakage on fittings and pipes, while losses during repairs or extensions are less hazardous.

Variations in the accuracy of gas meter readings are another source of apparent gas losses. The measuring error for gas meters in the U.S.S.R. is specified as ±2%, but observations over many years have shown that meters with slide valves have errors of up to 12% after ten to 15 years of service due to desiccation of the leather components. Disc valve meters, on the other hand, suffer from leakage across the valve overlap.

Large-scale checks of gas meters in Lvov over a period of four years have confirmed that the statistical distribution of errors in gas meter readings corresponds fairly closely to the theoretical prediction. In the majority of Soviet gas board areas the total gas losses amount to 3% to 5%.

Variations in the magnitude of the losses of 1% to 1½% up or down over a period of one to three months are not sufficient to serve as a criterion for the condition of the distribution system, because temperature variations and other factors intervene. The effectiveness of any measures taken to lower the losses can be assessed only by comparisons over at least one year.—*V.I. Kozatchok. Gazovaja Promyshlennost* (Gas Industry), *April, 1960*, **5**.

Replacement of submarine gas lines

THE gas network of the city of Copenhagen is divided by water into two parts, Sjaelland where the gasworks are, and Amager where much of the demand is located. These two areas have been connected together for some 20 years by two 400-mm. gas lines, one low pressure and one at higher pressure, laid in a submarine tunnel.

The existence of a large supply of refinery gas in Amager and the deterioration of the gas lines has made replacement essential. The tunnel is cut from the chalk about 20 m. below ground level for a length of 240 m. and is about 170 cm. high and 200 cm. wide; access is through 4-m. diameter vertical shafts. Entrance could be made only from one end since the other end is closed by a plant house. The tunnel is normally full of water.

Replacement started in September, 1959, after the tunnel had been pumped out by cutting up the existing lead-jointed pipes and removing them with a hand bogie and motor-driven crane.

Conditions underground were very wet, water pouring in at points in the roof. Personnel were fully clothed in waterproof clothes and worked habitually in 10-20 cm. of water. A low voltage lighting and telephone system were installed with considerable difficulty.

The replacement pipe was Class B piping with rubber-sealed sleeve couplings for the horizontal section, chosen for speed of assembly, and flanged joints for the vertical part. A water trap was provided at the lowest point with a release to the surface. Considerable suffocation danger existed and careful ventilation was required. With a 30-man team working two shifts, and very careful planning, the replacement was carried out in five days.—*S. Favrholdt, Gasteknikeren*, Vol. 49, No. 2, Jan. 21, 1960.

Cookers with television

AN outstanding gas cooker novelty will soon be shown publicly by Smalteria e Metallurgica Veneta, of Bassano del Grappa.

This company has added a new model to its range of gas cookers, the Tele-Aequator, which, in addition to the operational features and the appearance of the earlier 404 model, also has a special device—a 'television mirror.'

The advantage of this novelty lies not only in its appear-

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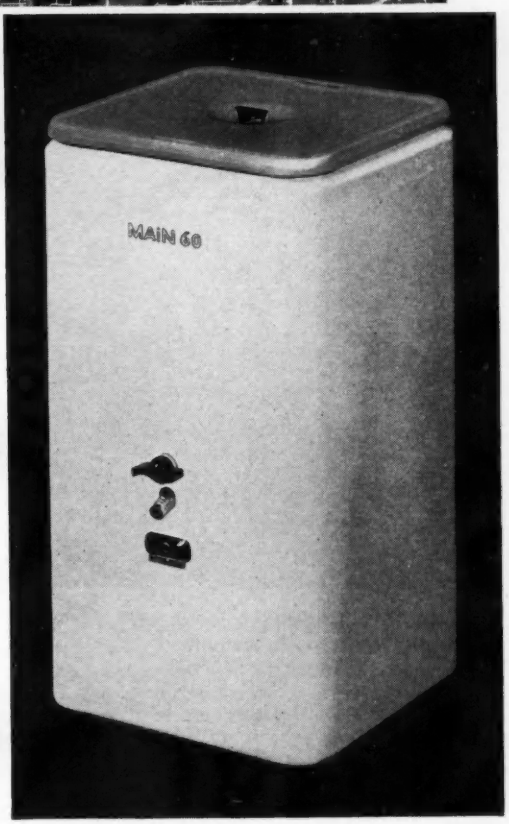

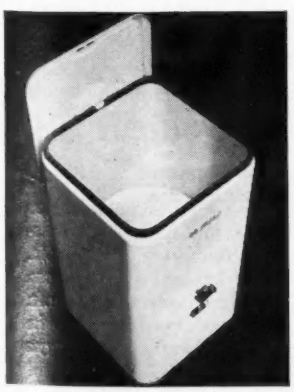

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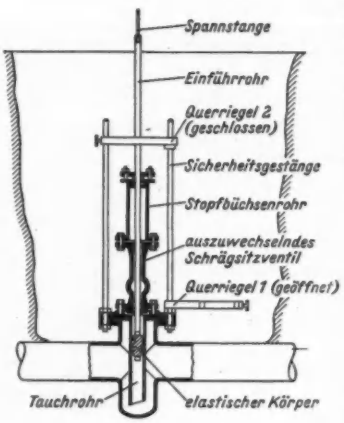
ance, but also its practical value, since it makes the work of the housewife more comfortable and pleasant.

The television mirror at the centre of the ledge clearly shows the food being cooked in the oven. This is done simply by turning a knob and saves the housewife the discomfort of having to bend in order to open the oven.

With this ingenious development it can be stated that Italian manufacturers have reached the highest level of perfection in this field. In fact, Italian gas cookers have created great interest throughout the European Common Market.—*Apparecchi Elettrodomestici nella casa moderna, March, 1960, No. 3,* **8.**

Changing gas valves under pressure

THE condensate traps which are placed at intervals along gas mains now often only collect dry dust, owing to the careful drying of the gas at source. This dust is periodically blown off into a mobile receiver through two valves arranged as shown in the diagram, namely, an angle-seat valve and a blow-off valve. The blow-off valve which can be repaired or replaced is, in this case, a sacrificial valve when the line is under pressure by closing the angle-seat isolating valve.



It is found, however, that with long use the isolating valve also suffers abrasion by the dust and requires changing. The method which is used by Thyssen gas engineers to carry out such a changeover can be seen from the diagram. A stuffing-box tube containing a rubber plug is mounted on the top of the closed isolating valve, which it is intended to replace, the other fitting having been removed previously.

The isolating valve is then opened and the rubber plug pushed through until it is situated in the syphon pipe below the valve. The rubber plug is then secured in position by locking the central rod to the two external safety rods by the top clamp. Provided the plug is leak-tight the valve may now be disconnected and lifted upwards until the bottom clamp can be engaged on the central rod.

On releasing the top clamp, the valve and stuffing-box tube can be removed; the stuffing-box tube is changed to the new valve and the process is reversed. The rubber plug is expanded by an external force as in the diagram. Thyssen-gas are developing an improved design of rotary slide valve on the 'Elita' principle which ensures that the sealing surfaces are clear of the gas stream when the valve is in the open position. *G. Hartmann. Das Gas- und Wasserfach,* 703, 100, 1959.

Changing a leaking blow-off valve under pressure.

Legend (from top to bottom).

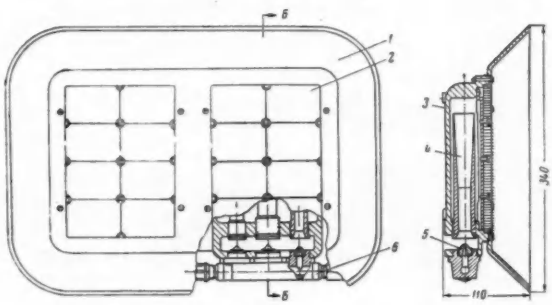
Spannstange	*'Pressure Rod'*
Einführrohr	*'Central Rod'*
Querriegel (geschlossen)	*'Clamp 2 (closed)'*
Sicherheitsgestänge	*'Safety Rod'*
Stopfbüchsenrohr	*'Stuffing-box tube'*
Auszuwechselndes Schrägsitzventil	*'Angle-seat valve to be exchanged'*
Querriegel (geöffnet)	*'Clamp 1 (open)'*
Tauchrohr	*'syphon tube'*
Elastischer Körper	*'elastic plug'*

New burners for radiant heaters

THE Institute for Gas Utilisation at the U.S.S.R. Academy of Sciences, developed in 1958 and 1959 a number of flameless injection-type burners consisting of a nozzle, a venturi-type mixer, a distribution chamber and a ceramic cover with narrow ports through which the gas issues with a velocity of 4 to 5½ in. per second.

The ceramic cover is built up from small ceramic plates 2⅜ in. by 1¾ in. by ¼ in. thick, with 570 small holes of .07 in. diameter, in each.

The analysis of the ceramic material is given as 45% Tchasov-Yarskaya clay, 25% kaolin, 5% chromic oxide and 25% talc. A special press has been designed to manufacture these elements. Reflectors are normally added to create a concentrated beam of heat in any desired direction.



Legend:—

1. *reflector.*
2. *radiating elements.*
3. *distribution chamber.*
4. *injectors.*
5. *nozzles.*
6. *gas manifold.*

The small masses involved enable the full temperature to be reached in 30 to 40 seconds. One unit of the type illustrated is stated to be adequate for a floor area of 130 sq.ft. A conveyor in a smoked fish plant is being converted from a 150-kW. electric heater to 32 gas-fired burners of 35 cu.ft. per hour each. Other industrial applications are also in hand.—*A. M. Levin and A. V. Markovski. Gazovaya Promyshlennost.* (Gas Industry), 1960. **5,** 20.

Technical developments

Steel thickness gauge

SOLUS-SCHALL LTD. are marketing an 8-mm. magnetic thickness gauge, Model 2211, which measures the thickness of steel tubes or steel plates. This equipment permits accurate and rapid identification of sound tubes or plates from those corroded beyond the limit of a specified safety margin.

The equipment is transportable and operates from battery or mains power supply. It consists of a control unit and a magnetising probe. Operation is simple. The magnetising probe is held to the tube or plate to be tested and, when the magnetising push-button is depressed, steel thickness is shown on the meter. The control unit provides two meter ranges to measure up to 8 mm. of steel thickness.

Model 2211 can be supplied with either hand or foot magnetisation control, and Solus-Schall Ltd. also provide an inspection service using the equipment, which covers X- and gamma radiography, ultrasonic, penetrant and magnetic methods of non-destructive testing. The gauge weighs approximately 30 lb., and is 16½ in. wide, 7½ in. high and 9 in. deep.—*Solus-Schall Ltd.*

New rust remover

PITAN rust remover clears rust efficiently from the interior of closed systems such as turbines, fresh water systems, boilers, sterilisers, sprinkler systems, heating systems, engines and storage tanks, and from any other closed equipment of piping system which would be difficult to clean by mechanical methods.

This rust remover does not require disassembly of equipment, which can be cleaned by inexperienced personnel, without any danger of damage to parts. The solution may be left in equipment indefinitely without damaging any surfaces, and may be circulated with the water in various pieces of equipment without any loss of effectiveness, although in most cases stationary contact is adequate at any temperature above freezing point of the solution used.

This rust remover does not attack the molecular structure of the metal and converts iron oxide to a complete solubility. All the components of the solution are non-combustible and non-toxic.—*Allweather Paints Ltd.*

Rotary feed valves

A COMPACT means of discharging and feeding powders, dust and granular materials, Visco Rotary Feed Valves are supplied in a variety of metals to suit the purpose for which they are required. They have interchangeable long and short housings and may be coupled to a geared motor unit either by V-belt, chain, or directly.

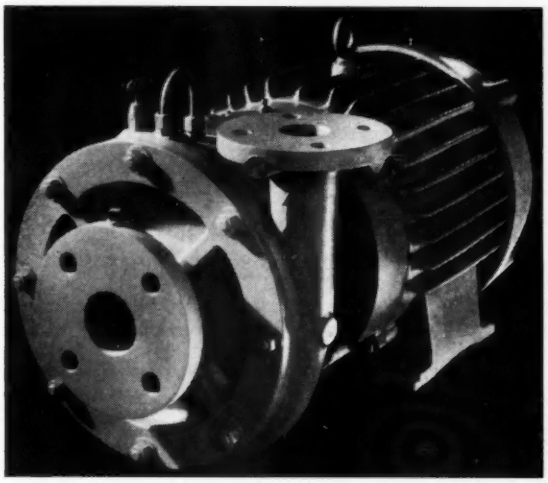
When material has to be discharged into a common hopper from adjacent containers subjected to slightly differing negative pressures, the Duplex type of valve may be employed, which avoids the use of two valves. Where cross-contamination of powders at valve discharge cannot be tolerated, separate valves must be used.

Machined to much closer limits than the standard type, the vacuum models are provided with phosphor bronze lined outboard bearings and have spring loaded rubber seals at shaft entry to the body.

A drilled and tapped hole will be provided where a balancer or pre-vacuum connection is contemplated.—*The Visco Engineering Co. Ltd.*

Centrifugal pumps

A NEW range of single stage centrifugal pumps, the Alcon Thames range, is of size from 1-in. to 5-in. The pump casing is of close grained cast iron with horizontal or vertical discharge as required; the impeller is in gunmetal which is hand finished and balanced, and there are passages through the hub to relieve stuffing box pressure and give hydraulic balance. Impeller rings are constructed of renewable gunmetal and the sleeve is made of



One of the Alcon Thames range.

renewable bronze extending through stuffing box protecting shaft. The gland is of gunmetal, the water thrower rubber, and the fittings consist of an air valve and drain plug.

The motor carcase and endshield are in close grained cast iron and are extremely rigid; the frame is fitted with substantial feet. The stator is a 3-phase 50-cycle induction type Class E insulation specially insulated and impregnated to exclude moisture. There is a single row of deep groove ball bearings grease lubricated, and the shaft is of 40 tons tensile steel ground all over and of rigid construction. The pumps may be operated either by petrol or diesel engines, and can also be supplied suitable for belt-drive.—*Arthur Lyon & Co. (Engineers) Ltd.*

New mobile crane

THE new Staffa crane with its hydraulic luffing gear is not only able to luff under load, but is now fitted with a double acting ram to speed up this operation. It will ultimately replace Staffa Three and Staffa Four cranes.

While following in general appearance the familiar lines of its predecessors, the new crane is of more robust construction, with increased visibility from the driving position provided by the new open type A-Frame. To ensure that the crane will operate under the most arduous conditions, a heavy duty hoist box has been incorporated together with a new heavy duty differential and a cast steel axle casing. Smooth operation of the crane is ensured by the provision of hydraulic brakes as standard equipment.

The crane has been designed so that all parts are readily accessible, and although this means that the body of the machine is slightly wider than that of previous models, the

The new Staffa mobile crane.

manoeuvrability of the crane has not been affected. The overall height of 10 ft. 3 in. permits operation within most industrial buildings, and the degree of manoeuvrability is such that the crane will travel down a 6-ft. 6-in. gangway, or will perform a right angle turn from a 13-ft. gangway.

A simple extension fitment permits the standard jib to be converted to a long jib to provide greater lifting heights and outreach, whilst the swan neck extension is also available for operation in the timber trade or any other industries where bulky loads require to be handled.

The crane is supplied complete with a cab and all ancillary equipment.—*Chamberlain Plant Ltd.*

Solvent type cleaner

PYROCLEAN No. 104 is an emulsifiable paraffin based solvent type cleaner of the soak type which is used cold for degreasing work coming forward for phosphating. It is intended for cleaning iron, steel and other metals and may be used in still tanks and in automatic immersion plants.—*The Pyrene Co. Ltd.*

Trade Publications

A NEW catalogue entitled 'Laboratory Equipment' lists the range of products which the Loughborough Glass Co. Ltd. can supply from stock. The first section is devoted to Loughborough Specialities, and the rest is divided into Interchangeable Laboratory Glassware, Plastics Laboratory Equipment, and General Laboratory Equipment. The catalogue includes new products and excludes others which are no longer in demand.—*Loughborough Glass Co. Ltd.*

'Speciality Equipment for the Gas Industry' is the title of a new booklet brought out by Lister Blackstone, giving details of engines, coupling, weatherproofing, as applied to the industry.—*Blackstone & Co. Ltd.*

A number of catalogues has been prepared by the Cambridge Instrument Co. Ltd. The first, List 47/1, describes the complete range of draught and pressure indicators, recorders and controllers. List 331/1 describes the pneumatic temperature measurement system, designed to provide non-electric indication and recording at considerable distances from the point of measurement. Gas analysis apparatus is the subject of the catalogue List 333, which describes a particular application of this apparatus. Temporary List 310 gives a description of the Cambridge 'Numalec' programme controller for temperature/draught or pressure. Supplement B to List 186 has details of controllers based on the Cambridge standard electronic self-balancing recorder. Supplement C to List 186 describes an electronic self-balancing recorder that is designed to select and scan from 20 to 400 points.—*Cambridge Instrument Co. Ltd.*

The manufacturers of Anogal rust-proofer have produced several new publications about their product, which describe its uses, properties and advantages over other methods of rust-proofing.—*Corrosion Prevention Ltd.*

A catalogue issued by Londex Ltd., manufacturers of electrical automatic control apparatus, entitled 'Electro-Magnetic Valves,' introduces an extensive range of valves manufactured for Londex by Concordia G.m.b.H., Stuttgart. Some of the models shown in the catalogue are manufactured at the firm's own works in London. Described in the catalogue are single-way valves for air, water, and non-corrosive gases and liquids up to a viscosity of 6° Engler, single-way valves for low gas pressures, single-way valves for steam, single-way valves for fast and/or frequent operation; three-way and four-way valves for compressed air and hydraulic fluids, and pressure switches and valves type LF/VA.—*Londex Ltd.*

Flow indicator

In an item of last week on the Arkon high pressure flow indicator, which appeared on p.403, the indicator was reported as withstanding pressures up to 22 p.s.i. This should of course have read 200 p.s.i.

26th I.G.E. AUTUMN RESEARCH MEETING

Refractories

51st REPORT OF THE JOINT RESEARCH COMMITTEE: 1959-60

THE first paper in the report, 'A Note on the Significance of "Critical Strain" in the Flaking Problem,' by N. F. Astbury, W. R. Davis, and F. T. M. Smith, introduces a new idea into the continuing discussion of the problem of flaking in continuous vertical retorts. The last (50th) report presented the results of an interim inspection of one of the flaking trials that are in progress in various areas, and the order in which the trial materials were placed with respect to resistance to flaking was quite unexpected. The materials used in these trials were selected in the belief that low porosity and low permeability, allied if possible to great strength, were the properties that most favoured resistance to flaking in silica bricks. In the retorts inspected last year, however, resistance to flaking obviously did not depend primarily on the predicted properties, but on some other property, which could not then be identified.

A property has now been found that seems to place the trial materials neatly in the same order as their resistance to flaking. This property is the 'critical strain,' and is the reciprocal of a property that has been mentioned in several previous reports, i.e., the ratio of modulus of elasticity to modulus of rupture.

Tensile strain

'Critical strain' (i.e., the ratio of the modulus of rupture to modulus of elasticity) is inherently a measure of the *tensile strain at break*. Its values in the trial silica materials correspond well with the order of merit observed in the first flaking trial, the agreement being particularly good at about 900°C., which is near the average working temperature at the working face of the bricks in the flaking zone. The correspondence should perhaps be noted with reserve for the present, for it is based on the results of only one trial observed at an early stage of the retort's expected life, although recent observations of other trials (described in Section VII of this report) at least confirm the placings of the first and last materials in the order of merit.

Having concluded that a brick's resistance to flaking may depend on its ability to bear a tensile strain, we must now enquire how such tensile strains arise and how they may lead to fracture. Formal analysis of various models shows that a 'limiting strain' mechanism of failure is provided by a system in which there is a stressed zone on the surface of the brick, induced presumably by carbon penetration, very much in the way suggested by Laming.

If we can be sure that a high critical strain imparts good resistance to flaking, the obvious next step is to find how high critical strain can be built into a silica brick. Before we embark on an intensive study along these lines, however, it is very desirable that we should be sure that the link between high critical strain and resistance to flaking is a general one applying to all retort conditions. Unfortunately, the trials are all at an early stage and for some years are not likely to be available for accurate measurement.

Some method of measuring the depth of flaking while the retorts are laid off for scurfing is urgently required if present use is to be made of the current trials. The second paper in the report, 'Flaking in Continuous Vertical Retorts, a Study of Photogrammetric and Mechanical Methods of Measuring the Depth of Flaking at Working Temperatures,' by J. F. Clements and L. Sabiston, described experiments with two such methods. Both require further development, but both have given encouraging results even in their present form.

The first method employs the technique of photogrammetry, which is the basis of aerial surveying. Photogrammetry is in essence the measurement of photographs and the application of simple geometry to find the true size and position of the photographed objects. For most applications, including the present one, it is necessary to use stereophotography. The accuracy of the calculated sizes and positions depends primarily on the quality of the photographs, and up to the present time the difficulties encountered in photographing hot retorts have not been entirely overcome, although some good pictures have been obtained. Given a pair of photographs showing clear surface detail on the retort wall, it is possible to determine the distance of individual features to about $\pm\frac{1}{4}$ in. at 10 ft. This information is often useful in itself, since it can be used to define the position and extent of the flaking zone. It has been used for this purpose in a recent observation of one of the flaking trials described in Section VII, where photogrammetric measurements have shown that the flaking zone has missed some of the trial panels. This could not have been decided by visual observation.

'Bump' heights

Calculated distances together with measured 'bump' heights on the photographs will give the depth of flaking if it is of the hill-and-valley type with some of the original brick surface remaining on the hills. If, however, the flaking zone shelves gradually from the undamaged brick a different method must be used, by means of which a profile of the retort wall is obtained. With good photographs, the position of points in the profile can be determined to $\pm\frac{1}{2}$ in. An example of this technique is described in the report.

Orthodox practitioners of photogrammetry would not approve of its application for the present purpose. The main objection is that the angle of view is wrong, for surface features may be lost in hidden ground. This is true,

and the method is being used with that reservation in mind.

The second method of measuring the depth of flaking is simpler and more direct than the first. It employs a ' profile gauge ' resembling a long comb with movable teeth, set 1 in. apart, which is inserted into the retort and manipulated into contact with the wall over the length of the flaking zone. The operation calls for some skill and much fortitude, but, if it is properly carried out, the positions of the teeth when the gauge is withdrawn indicate the contour of the wall, with an accuracy that it thought to be about $\pm\frac{1}{4}$ in. This method is superior to the photographic procedure in that there is no ' hidden ground ' that is not penetrated by the probes, and at the moment it is the only method that can be applied to the wall under the observer's feet. It has the disadvantage, in its present form, that it can only reach the parts of the retort wall lying under the top opening. A cranked handle will now be tried, which will enable the gauge to cover the whole width of the wall and possibly also to reach the opposite wall where its measurements would supplement those of the photographic method.

Repair schedules

It is thought that these methods, which were primarily intended for use with the flaking trials, may be of general interest since a knowledge of the exact state of the flaking zone will often be helpful in drawing up repair schedules.

The third paper in the report, ' A Study of some of the Factors Affecting the Rate of Burning of Scurf, Part II —The Effect of Temperature and Atmospheres of Steam and Air,' by L. Sabiston, is in the nature of a postscript to an investigation described last year on the rate of burning of scurf. It will be recalled that the rate of burning between 900° and 1,200°C. was found to be substantially independent of temperature and to depend primarily on the air supply. In the discussion of the report, Dr. Blakeley pointed out that 900°C. must be near the lower limit of temperature independence, and that the temperature-dependent range would probably be found to begin just below 900°C. This point has now been checked by extending the temperature range of the measurements down to 480° and up to 1,400°C. The results are in line with Dr. Blakeley's findings and show that combustion of scurf can be sustained at 480°C., that the rate of burning is almost linearly related to temperature between 550° and 650°C., and that between 650° and about 800°C. it passes through a transition from direct dependence to independence.

The third paper includes results of some experiments on the effect of adding steam to the combustion air. They show that the rate of burning is definitely reduced by the presence of steam, although the mechanism of the effect is not clear. In practice, the introduction of steam into a scurfing retort will have a secondary effect in that it will reduce the amount of air induced by reducing the negative pressure.

The fourth paper, ' Further 'Observations on the Behaviour of Refractories in Oil-gas Plant,' by L. Sabiston, brings up to date the information presented in the 49th Report. Recent visits to catalytic oil-gas plants have confirmed the earlier observation that the refractories in the combustion chamber become glazed and may ' peel ' on cooling, but not to any serious extent; that some spalling, again not serious, may occur in the air preheater; that little or no damage to the refractories occurs in the catalyst vessel; and that serious damage occurs only in the steam preheater or regenerator. It has been possible this year to measure the temperature near the top checkers in this vessel, and to inspect the inside of the vessel through a water-cooled periscope.

An appendix to this paper gives a description by Mr. Wylde, of the North Thames Gas Board, of experiments carried out in the checkers of catalytic oil-gas plants and of carburetted water gas plants. These experiments included the use of cordierite bricks and silica bricks in the top courses. Cordierite bricks have low thermal expansion and should, therefore, have good resistance to thermal shock; nevertheless, in the checkers they were shattered almost immediately. The failure of cordierite to withstand the prevailing conditions has been confirmed by trials initiated by the Research Association. Silica bricks have even lower thermal expansion than cordierite if the temperature remains above about 400°C. In the top checkers of a North Thames carburetted water gas plant, silica bricks cracked extensively, but were not shattered.

All these experiments point to very severe thermal shock. The temperature measurements referred to above confirm this diagnosis by indicating rates of heating and cooling reaching 200°C. a min. in the top course. A simple experiment in the laboratory, followed by a brief calculation, shows that such rates of temperature change would produce tensile stresses in a brick about 10 times as great as its tensile strength. Under such conditions, any brick will crack, but the manner of its cracking will depend on its nature; cordierite bricks, which are dense, will shatter; firebricks of open texture, such as those commonly used in this position, will crack gently. Even these ' gently-cracking ' bricks, which would normally remain in one piece, will eventually be disrupted by carbon deposition in the cracks. The replacement of the top course of bricks by high-temperature alloy blocks, which is now being tried in the checkers of several plants, provides a solution to the problem of thermal shock, but there is an additional problem of choking of the gas ways by ash and carbon deposition, which is quite independent of the material used, and for which a solution must be found in terms of design or operation.

Checker trouble

It now seems certain that checker trouble is encountered only in plants operating on 950-secs. oil. Several plants are now gasifying light distillate (P.F.D.), which seems to leave the refractories quite unharmed.

The fifth paper in this report is ' Recent Developments in the Testing of Refractory Materials,' by J. F. Clements, A. R. L. Moffat, J. Vyse and N. F. Astbury. Some of the tests applied to refractory materials are measurements of physical properties, such as porosity and permeability, which have definite values. Such tests only require attention to detail to yield a determinate result. Other tests bring a number of properties into play in some indeterminate combination, and the result obtained is entirely dependent on the testing conditions employed. In this category, we have the tests for refractoriness-under-load, refractoriness, and cold crushing strength. These tests in their present forms have been in use for many years, and a store of experience

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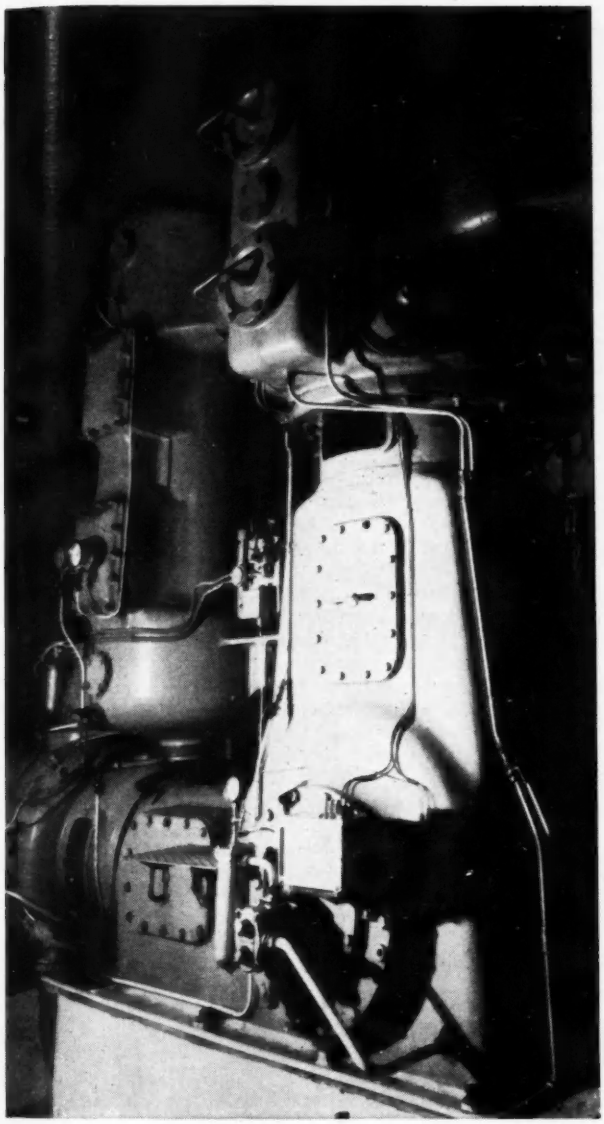

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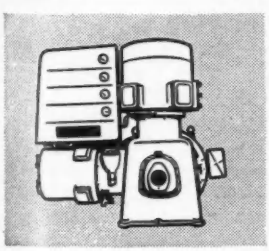
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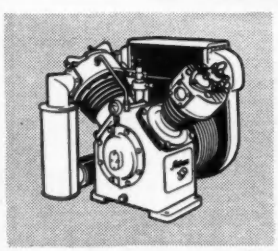
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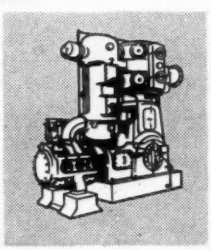
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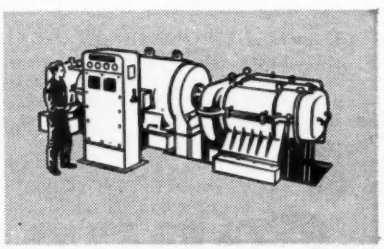
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Says **PHILIP HARBEN . . .** "thank goodness old-time open spit roasting—REAL ROASTING, is back! This new Cannon Cooker Open Roasting Spit is the most exciting thing that has happened to cooking for over a hundred years. Already thousands of happy families are enjoying the true flavour of meat, poultry and game which only Open Spit Roasting can give and with the Cannon Spit there is no splattering."

BRITAIN'S FIRST COMPLETE COOKER includes . . . ★ Combined Super Chef Open Roasting Spit and large grill FOLDS AWAY into a space 4½" deep! ★ New design spill-over sealed Hotplate takes four 10" pans. ★ Large EASY CLEAN cooking oven. ★ Storage drawer. ★ Automatic Ignition. ★ STILL AVAILABLE ON 4-YEAR EASY TERMS.

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WITH THE SENSATIONAL SUPERCHEF OPEN-ROASTING SPIT & GRILL

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SALES POINTS you will find helpful when talking to customers in the Showroom.

ONLY CANNON GIVES *REAL* ROASTING
Cooking in an enclosed oven is BAKING which dries up the succulent, true flavour of meat, poultry and game. Only an open Spit can give REAL ROASTING.

THE SUPERCHEF ROASTS WITH 2 KINDS OF HEAT
Quick Radiant Heat to "seal-in" the natural juices. Infra Red Heat to give that true, tempting flavour—right through!

THE SUPERCHEF OPEN SPIT DOES NOT SPLATTER
The Roasting Spit rotates towards the *backplate* of the Cooker—the surface juices roll around the meat or poultry and, actually *baste it!*

THE SUPERCHEF FOLDS AWAY
When not in use the spit and grill folds away into a space of only 4½ inches!

THE SUPERCHEF IS SIMPLE TO USE
It is quicker, easier and far superior to oven cooking.

THE SUPERCHEF IS EASY TO CLEAN
In fact, it is "wipe-over" clean in a few seconds.

has been accumulated in terms of current values obtained under current conditions. If for any reason it seems desirable to change any of these conditions, the change should not be made without careful consideration, since it might alter the values obtained and make the new results meaningless in terms of the old.

A change of this kind is being considered by the Refractoriness-under-Load Committee of the Research Association, which has recently found that the chief source of differences between laboratories in the rising-temperature test now is column expansion, which is a furnace characteristic and is not easily controlled. Its effects can only be eliminated by correcting all rising-temperature under-load results to zero column expansion, which would have the effect of moving all the values down the temperature scale. Column expansion does not seriously affect the maintained-temperature test, and it is hoped that forthcoming co-operative tests will show a degree of concordance similar to that now found for the rising-temperature test and will strengthen the case for the general application of this form of test.

The standard refractoriness test in this country, as in others, is based on the use of pyrometric cones, and it is disturbing to realise that these cones are not at present subject to the scrutiny of any standardising authority. It is suggested, in the second part of this paper, that refractoriness should properly be measured in terms of temperature, without the invention of standard cones. This change could be introduced without altering the values obtained for refractoriness.

If a refractoriness furnace is improved until its temperature uniformity is as good as it should be, the cones cannot be seen. The fall of a cone can be detected by electrical means under these conditions, and the paper describes how this is done.

The third item in this section advocates a change that may be of importance to the gas industry. In the measurement of cold crushing strength as described in the present British Standard, tarred roofing felt is used as packing material, and the Testing Committee of the Research Association now suggests that this material should be replaced by cardboard. Since, however, the values obtained with cardboard as packing are roughly double those obtained with roofing felt, the change could have important consequences in acceptance tests.

Permeability

The remaining parts of this section deal with experiments by the Research Association on the measurement of permeability and of the porosity of granular materials.

The sixth paper in the report, dealing with the progress of other investigations, contains further interim reports on the flaking and iron-spot trials. Flaking trials have been inspected at three works. At the first, only visual examination was possible, and the paper calls attention to the unsatisfactory nature of a visual assessment. All that could be said of the trial materials in these retorts was that D was flaked least, on the average, and that E appeared to be rather worse than the others. At the second works, all the retorts had flaked very lightly, and on some faces the only flaking to be seen corresponded with the position of material E. At the third works, the Research Association observers tried to make a visual assessment of the trial panels, but were defeated by the total absence of pattern in the flaking. Photographs were taken of two of the retorts, and here photogrammetry proved its worth by demonstrating that the flaking zone was narrow and high in the retorts and had in fact missed most of the lower panels. Visual assessment in these circumstances can be quite misleading.

One of the most interesting features of the progress report is the description of a cold inspection of a continuous vertical retort containing iron spotted bricks. The gist of the report is similar to that of previous reports on the iron-spot trials: No harmful effect is evident. A cold inspection of a horizontal gas retort containing adventitious iron-spots has also been made. Here again no harmful effect was detected. Interim reports on iron-spot trials in other areas have been collected, and these too are negative in that no effect of any kind, attributable to the spots, has been detected.

Activated coke

There has apparently been a revival of interest in the production of activated coke, and enquiries have been received from several sources as to the possible effect on the refractories of the alkali added to the coal. There is remarkably little information to be found on this quite important matter, and experiments have now been initiated in the Research Association's laboratories to discover in the first instance how the alkali is shared between the retort refractories and the charge. Preliminary tests have been carried out in a small experimental retort to simulate operating conditions as far as possible, but there has been some difficulty in obtaining an 'alkali balance,' and it will be necessary in this preliminary work to reduce the scale of the tests so as to permit a greater degree of control. Evidence has already been obtained, however, of a progressive absorption of alkali by the refractories.

Other items in the progress report deal with a new apparatus for measuring the tensile strength of refractories, the progress of the long-term investigation on spalling, and the research that has recently been started on the properties and behaviour of mouldable and castable refractories.

WHEN B.S.758, 'Small domestic hot-water supply boilers using solid fuel,' was published in 1955, only manually controlled boilers were considered. The increasing use of thermostat control has necessitated the preparation of this new British Standard, which is issued as Part 2 of B.S.758, the original document becoming Part 1.

This new standard deals with boilers for domestic hot water supply with a working pressure of up to 52 p.s.i. and a heating surface of up to 10 sq. ft. They are designed to burn solid smokeless fuel and normally have a rated output of 6,000 B.t.u. for each square foot of heating surface. Minimum design requirements and performance standards are laid down and methods of tests are described by which compliance with the standard can be ascertained.

Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1., price 7s. 6d. (Postage will be charged extra to non-subscribers).

NEWS SUPPLEMENT

FLOOD TOWNS' GAS CUT

WHEN the worst flooding in living memory hit Central and Southern Wales and the Border Counties at the weekend, causing millions of pounds worth of damage, the gas supply was cut at Newtown, Montgomeryshire, where shop fronts collapsed and buildings in the town centre were isolated.

At Hereford hundreds of people were stranded in bedrooms and gas and electricity were also cut off there.

13% bonus for Sugg workers

SPEAKING at a meeting in London, Mr. W. T. Mattock, retiring chairman of William Sugg and Co. Ltd., declared a bonus on the profit sharing scheme of 13%, which was very nearly four times as much as last year, and worked out at 6½ weeks' pay for each employee. The meeting was a presentation ceremony held for Mr. Mattock at which long service awards were also presented to members of the staff.

Mr. Mattock said that he was retiring to have a few years leisure. He continued by saying that he thought the profit sharing scheme was one of the best schemes that could ever be introduced. In addition to profit sharing the company had recently introduced sickness benefits, and had now decided to institute a redundancy scheme. Should the company fall on bad times or circumstances occur in which redundancy was bound to arise, any man with over five years' service would get a week's pay for every year of service in excess of five years.

Referring to the labour situation, Mr. Mattock said that he hoped the improved bonus, the improved working conditions, and sickness payment would attract employees to the firm.

Towards the end of the meeting Mr. Mattock was presented with silver candelabra, by Mr. R. W. Young, the new chairman.

Northern puts prices up by 7½%

GAS prices in the north of England are to go up by 7½%. This has been announced by the Chairman of the Northern Gas Board, Mr. E. Crowther, but he said that 'in consideration of prompt payment' the net rise would be only 5%.

He told members of the Northern Gas Consultative Council that consumers using coin meters would automatically get a reduction of 2½%, and credit consumers would receive the same reduction if they paid their accounts within 21 days.

The new prices will come into effect after the next reading of meters. The rise is the first since July, 1957.

Gasification : Minister sees a benefit for coal

COAL is likely to derive the greatest benefit from the improvement of existing methods and the development of new methods of gasification, said the Minister of Power, the Hon. Richard Wood, in a Parliamentary answer.

He had been asked for a statement on the recommendations on organisation of the Wilson Committee on Coal Derivatives.

He said he was discussing with the coal and gas industries the best means of giving effect to the recommendation about work on slagging gasifiers. He accepted the other recommendations on organisation, which deal with work on other gasifiers and on producer gas plants.

Asked if he would urge the Gas Council to speed up the job of the Lurgi gasification process, the Minister said that the Gas Council was well aware of the importance of the Lurgi process.

5 hurt in explosion

FIVE men were injured in an explosion at the Scottish Gas Board works in Grange Road, Dunfermline, Fife. Officials put a strict security cordon around the premises after firemen had put out a blaze in the purification plant.

English Electric and G.E.C. merger off

MERGER talks between the English Electric Company and General Electric Company have been broken off, states the *Financial Times*. A brief statement said the Boards had been unable to bring to a successful conclusion their discussions on a merger of the two groups through a holding company. It is believed that agreement could not be reached on the question of terms.

The combined net assets of the two groups total approximately £177 mill. and the merger would have been the biggest ever of two industrial companies in Britain, and have created the largest electrical group.

T.U.C. to question Premier on coal

THE T.U.C. is expected to ask for a meeting with the Prime Minister and the Cabinet to discuss the difficulties of the coal industry and to urge the Government to adopt a national fuel policy, states the Financial Times. *This course has been recommended by the General Council's production committee and is almost certain to be adopted when the council meets before Christmas.*

It was stated by Mr. W. Paynter, general secretary of the National Union of Mineworkers and a member of the council, that if nothing came of the T.U.C.'s approach to the Government, the initiative would presumably pass back to the N.U.M.

In a long memorandum to the N.U.M., the Minister of Power, Mr. Richard Wood, rejected all its arguments for Government aid and intervention, and also reproved the union for its 'unjustifiable pessimism about the industry's prospects.'

Institution Christmas Lecture

THE tenth Christmas lecture to be held under the aegis of the Institution of Gas Engineers will be given in the Main Chemistry Lecture Theatre of the Imperial College of Science and Technology at South Kensington, London, on Tuesday January 3, 1961, at 2.30 p.m.

The lecturer will be Mr. C. H. Lewis, who has chosen as his subject 'The Production of Fuel Gases.' The lecture will be supported with practical demonstrations and experiments.

Mr. Lewis is one of the Senior Research Chemists of the London Research Centre of the Gas Council and he will be supported by a team of colleagues from the Gas Council and the North Thames Gas Board.

Boards change boundaries in Lambeth

TO facilitate industrial development the Minister of Transport has authorised the stopping up of Lanfranc Street and parts of Burdett Street and Pearman Street in the Borough of Lambeth.

As a consequence several gas mains need to be moved and the North Thames and South Eastern Gas Boards, each serving part of this locality, wish to adjust their boundaries at the southern end of Pearman Street.

The sanction of the Minister of Power (following consultation with the Gas Boards, the Gas Council, the London County Council, the Lambeth Borough Council and the respective Gas Consultative Councils) has now been given in statutory form in The Gas (Area) (Lambeth) Order, 1960.

Copies of the order and of the plan showing the old and new boundaries can be seen during normal hours of business at:—North Thames Gas Board Headquarters—30, Kensington Church Street, London, W.8. Gas Showroom—Horseferry Road, London, S.W.1. South Eastern Gas Board Headquarters—Katharine Street, Croydon, Surrey. Gas Showroom—280, Walworth Road, London, S.E.17. 400, Brixton Road, London, S.W.9.

Western Juniors elect officers

THE Western Junior Gas Association held its Annual General Meeting at Taunton, 47 members being present. Mr. F. Tweedle was elected President for the 1960-61 Session, Mr. D. H. P. Hammond was elected Senior Vice-President, and Mr. J. Parker, Junior Vice-President.

The Area Development Manager of the South Western Gas Board, Mr. T. N. Dent, then presented silver medals to Mr. G. Howse and Mr. G. W. Jobbins for their paper 'Automatic Gas Controls,' which was also awarded an Honorary Members Prize by the Association.

Honorary Members Prizes were also awarded to Mr. J. J. Long, for his paper 'Ducted Warm Air Heating,' and to Mr. P. Trevelyan for his paper on 'The Use of P.F.D. in Continuous Vertical Retorts.'

CAR RECESSION MAY THREATEN GAS PRICE

RECESSION in the motor industry might affect hopes that gas prices in the West Midlands would not need to be raised throughout the 1961-62 financial year.

Prices, not raised since 1957, would be maintained at least until April next year, Mr. G. le B. Diamond, chairman of the West Midlands Gas Board, said at a West Midlands Gas Consultative Council meeting.

For there to be no price increases in 1961-62 there would need to be no falling off in gas sales or additional increases in costs and the Board would have to make further economies, Mr. Diamond said in a report covering the six months ending in September.

Whessoe/S. and J. activities growing

THE Shand and Jurs Company of Berkeley, California, and Whessoe Ltd. of Darlington, England, have just concluded an extension to their mutual agreement giving Whessoe the exclusive rights to manufacture S. and J. tank fittings in France and the exclusive rights to sell these fittings within the European Economic Community and the French Union.

Land secured

Land has already been secured in Calais for the establishment of a manufacturing and assembly plant which will be owned by Whessoe S.A., the company's French subsidiary now in the process of formation. Production of French manufactured and assembled fittings will start in the summer of next year.

The Whessoe/Shand and Jurs agency linkage, already active throughout Europe, will continue to be the marketing medium both for the tank fittings from this new source and for the already large production of S. & J. equipment at Darlington.

SHOWROOM IS MODERNISED

Extension and modernisation of the Eastern Gas Board's showrooms in Church Street, Peterborough, is now under way. The internal space is being doubled by the removal of internal ground floor walls, and a modern shop front is being installed to give more space for window displays. Cookery demonstrations will be given in a flat which comprises a kitchenette, living room and dining recess.

CHARGES *DOWN* AT COLERAINE

GAS consumers in Coleraine and Portstewart will pay reduced charges in the New Year as a result of recommendations adopted at the monthly meeting of Coleraine Borough Council.

Mr. T. R. Cameron, manager of the Coleraine Borough Gasworks, has recommended reductions in rates because of a substantial profit in the year 1959-60.

This year was the third successive year in which the undertaking has shown a profit. In 1957-58 it was £5,375, in 1958-59 it was £12,123, and last year it was £9,710. At the beginning of this year all gas consumers in the area got a rebate.

NEW SCRUBBER CONTRACT

A contract has been awarded by Glass Bulbs Ltd., to Chemical Construction (G.B.) Ltd., to supply a P-A venturi and cyclonic gas scrubber. It will handle approximately 6,000 cu.ft. per minute of saturated gas containing hydrofluoric acid fume. The installation will be at Glass Bulb's Ltd., Harworth Works, near Doncaster.

SIMON DIVIDEND

SIMON ENGINEERING LTD. have declared an interim dividend on 5s. Ordinary shares of 10%, less income tax, for the year ending December 31, 1960. A dividend on 6% Cumulative Preference shares of £1 each at the rate of 6% per annum, less income tax, has been declared for the half year ending December 31, 1960. Both these dividends will be paid on January 1, 1961.

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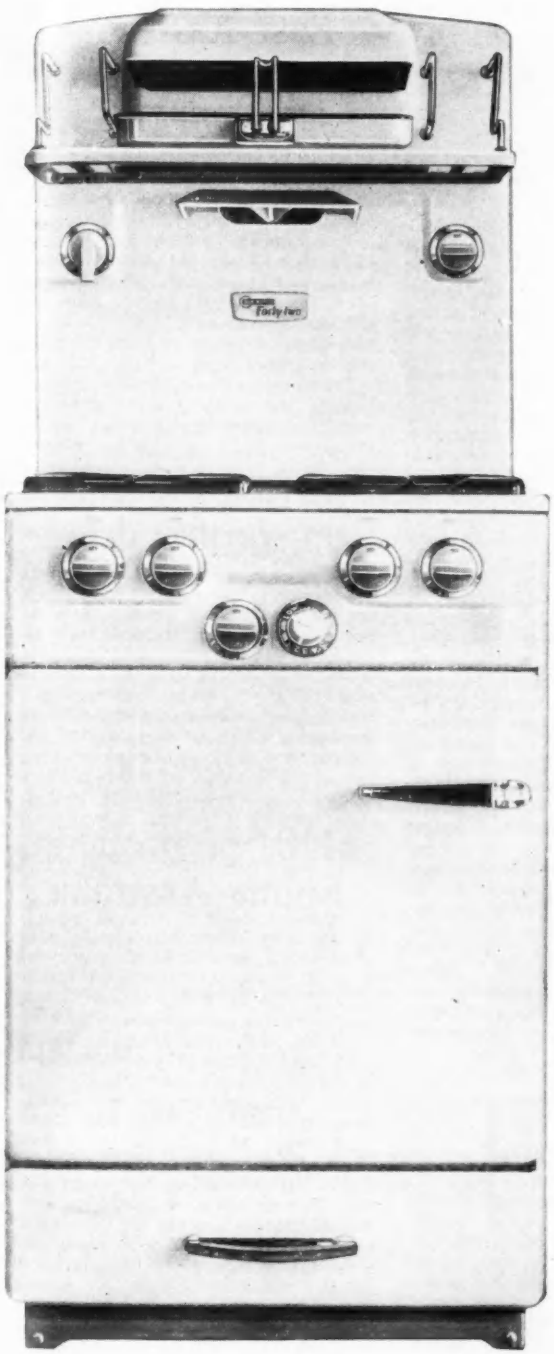
NEW WORLD 42



The recently announced price reduction of over £3 on the NEW WORLD 42 will stimulate and increase demand for this best selling cooker. Backed by large space advertising in the National Sunday press, the big circulation Women's Monthlies and Weeklies, and the Provincial Press, the 42 will be the year's most popular Gas Cooker.

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* See-at-a-glance Eye-Level grill—big enough to cook 6 chops at once.
* Spacious easy-clean hotplate.
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PRODUCT OF Radiation Ltd.

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Wales I.G.E. meeting hears paper on gas in United States

THE Annual General Meeting of the Wales and Monmouthshire Section of the Institution of Gas Engineers was held at Swansea. In the afternoon there was a visit to the R.T.B. Silica Brickworks at Landore.

During the meeting, Mr. Alan Yates, of the Board's Technical Headquarters read a paper on what he described as some of the observed procedures and practices adopted in the gas industry in the United States. The material was gathered during a period of about three months which the author spent in America.

Town gas supplies in the United States comprised natural gas modified with air only so far as was necessary to stabilise calorific value, he said. Methods of meeting the seasonal variations in gas demand fell into two main categories, namely increasing the summer load and peak shaving in wintertime. Probably the most important single method which helped towards meeting both requirements was the development of underground gas storage.

Peak shaving during extreme cold weather conditions could have been effected by: The use of interruptible supplies to industrial consumers whereby interruption was applied only during periods of maximum demand and on a weekly basis; the use of interruptible supplies to domestic space heating consumers whereby interruption was applied on the basis of ambient temperature; and peak load gas production in the form of l.p. gas/air, of high B.t.u. oil gas or of enriched carburetted water gas.

In the actual gas producing field there was usually little more to be seen than a series of 'Christmas Trees' (the assembly of valves and connections at each well-head), and connecting pipework to the gas collecting system.

Compressors at the gas collecting system, at re-compression stations on the transmission main and at underground storage fields near to the point of use were almost always gas-engine operated. Heat exchangers were in the form of fin fan coolers using air as the cooling medium, the fans being driven by hydraulic power from the engine crankshafts.

Measurement of the large quantities of gas handled at elevated pressures was invariably carried out by means of orifice flowmeters and considerable care was taken in maintaining accuracy of the instruments. Complete automation of pipelines with compressor stations and regulator stations was well within sight.

Many gas companies stabilised the calorific value of natural gas by the addition of air in carefully controlled quantities. One of the major problems associated with air inspiration and gas mixing at the pressures experienced was that of high noise level. At one station, the venturi tubes, regulators and immediately connecting pipework were all underground in concrete vaults.

The use of radio communication with personnel concerned in consumer service was found to be very widely adopted. The normal routine for the driver, after starting up his vehicle, was to make radio contact with the control centre to advise the direction of his journey and the anticipated timing. This applied to all levels of staff and enabled any man to be contacted with a minimum of delay.

Canadian gas sales up 20%

DURING the first half of 1960, Canadian utility companies sold 183,000 mill. cu.ft. of natural gas, which was 20% more than in the same period of the previous year.

Sales increased in all fields: Domestic sales by 11,000 mill. cu.ft., commercial sales by 6,000 mill., and industrial by 14,000 mill. There was no marked difference in ratio between the categories in 1960, domestic sales accounting for 39%, industrial for 44%, and commercial for 17%.

The number of natural gas customers in Canada continued to grow, and there were 1.14 mill. in June 1960, 8% more than in June the previous year.

£30,000 baths scheme

A scheme to install coke-fired boilers to replace the present coal-fired ones at four Leeds baths will cost £30,000. The baths are at Cookridge Street, Union Street, Kirkstall Road, and York Road, and the scheme is being considered by Leeds Corporation Baths and Property Committee. Two of the baths are in the Central Smoke Control Area and the other two are on the perimeter.

The Daily Mail Ideal Home Exhibition of 1961 will be held, as usual, at Olympia, and will be open from March 7 until 10 p.m. on April 3.

East Australian company's gas sales up 19.4%

SALES of gas by the Gas Supply Co. Ltd., reached a record peak in the year ended June 30, 1960, being 19.4% greater than in the previous year.

The company, which has branches throughout Queensland and New South Wales, had an increased profit after tax of £2,585 over 1958-59, the figure for 1959-60 standing at £134,375.

A further dividend of 3% on cumulative preference shares and 4% on ordinary shares will bring the total dividend for the year up to 6% on preference and 8% on ordinary shares.

Brisbane's sales up, profits down

BRISBANE GAS CO. LTD. had an increase in gas sales of £31,337 for the year ended June 30, 1960, over the previous year. Their net profit after provision for income tax stood at £109,078, which was £17,292 less than that of 1958-59.

A further dividend of 3½% will make the total dividend for the year 7%, and £10,890 has been appropriated to reserves.

£110,077 profit in South Australia

THE South Australian Gas Company showed a net profit for the year ended June 30, 1960, of £110,077, as against £112,532 for the previous year. Last year there was no over-provision for income tax, so the total available stood at that figure, as against a total available in the previous year of £126,817.

After deducting the dividend of 6%, comprised of a 3% interim dividend paid on February 24, 1960, and a 3% final dividend paid on August 31, 1960, the balance transferred to the Profit and Loss Appropriation Account last year was £80,783 as against £97,523. After adding undistributed profit from previous years, the Profit and Loss Appropriation Account stood at £407,285, as against £326,502.

Scottish first aid teams 5th and 7th

First aid teams of the men and women of the Scottish Gas Board gained seventh and fifth places respectively in the competition for the Grand Prior's Trophies.

The finals of the competition, organised by the St. John Ambulance Association, were held at the Porchester Halls, London, and 11 men's teams and eight women's took part.

Company Meeting

OXLEY ENGINEERING

Satisfactory order position

THE twenty-fourth annual ordinary general meeting of Oxley Engineering Co., Ltd., was held on December 1 at Leeds, Mr. S. Stansfield, M.Inst.Gas.E., M.Inst. W., M.S.E., chairman and managing director, presiding.

The following is an extract from his circulated statement for the year ended June 30, 1960:—

The consolidated net profit before deducting tax, is £122,996. This figure is £22,935 less than the trading period of 1958/59, which was shown as £145,931 before tax.

The profit put forward by the parent Company is given as £79,685 before tax, against the 1958/59 trading figure of £131,642 before tax. The reason for the lower profit is that intense competition in our class of work has gone on unabated throughout the year, and has resulted in lower profit margins in our tenders to obtain orders. However, I am pleased to inform you that our production is on the increase. Your Company has been able to secure orders for some very interesting and varied constructional work for production in the current year, and I consider the order position satisfactory. We anticipate some improvement in our figures for 1960/61, provided our production is not hampered by events beyond our control.

Steel deliveries

Some word must be said about the steel delivery position. Once more we are experiencing delays by the Mills, and again there is a tendency for our production programme to be retarded as a result of this.

Although the profit put forward by the parent Company shows a reduction on the previous year, I think it may be regarded as satisfactory. Our order book does vary from one point of time to another, and by the same token our profits are liable to fluctuate considerably, partly under the influence of general economic conditions, and to some extent to the long term productive period to complete given projects.

Referring now to the subsidiary Company of Thos. Dryden & Sons, Ltd., I am very pleased indeed to see a considerable increase in the profit figure over that of 1959.

We are recommending a dividend for the current year of 12½% less tax, plus a 3% tax-free dividend from capital profits.

You will doubtless expect me to make some forecast of the future, and I do so with great reserve, again reminding you that a business such as ours is largely dependent on the funds available to our customers. However, I think I can say that we look forward to the next twelve months with confidence, and will do our utmost to put forward a successful trading year.

The report was adopted.

Welding : Autumn Meeting

QUALITY in Welding was the subject chosen by Mr. E. Fuchs, President of the Institute of Welding for his Presidential Address to the Autumn meeting of the Institute. The following day was given over to ten papers on Welding Metallurgy. At the final meeting, the subject was Welding in the U.S.S.R. and Mr. E. Seymour-Semper, the leader of the Institute's team which visited the country in September, was in the chair.

COMING EVENTS

December 15. — MIDLAND JUNIORS: Visit to Pleck Gasworks, Walsall Division, West Midlands Gas Board.

December 20. — NORTHERN JUNIORS: Darlington. Short Paper Meeting.

Chemists consider integration

THE Presidents and Directors of the Centre Européen des Federations de l'Industrie Chimique (CEFIC), comprising the associations of Austria, Belgium, Denmark, France, Germany, Great Britain, Holland, Italy, Sweden and Switzerland, have again met. This was one of a series of meetings at which the chemical industry has considered the economic problems of integration in Europe.

It was decided to collaborate even more closely in an attempt to solve the difficulties arising from the existence of two economic groups in Europe.

Member associations also undertook to consider in detail in their own countries, the possible effects upon the principal sectors of the chemical industry of a free market covering the whole of Western Europe.

PERSONAL NOTES

MR. E. J. HOSKINS has been appointed Technical Service Manager, Geon P.V.C. dispersion resins; MR. W. S. MURE has been appointed Technical Service Manager, Geon P.V.C. pastes and latices. MR. S. MOTTRAM, at present Technical Service Manager, will become Chief Technical Service Manager.

MR. H. A. WARDLE has been made Sales Manager for Hycar nitrile rubbers and acrylates. MR. D. J. PRETORIUS, who has joined British Geon Ltd. from National Chemical Products Ltd., South Africa, will act as Sales Manager, Geon P.V.C. compounds.

MR. H. BRADLEY, station engineer at Beckton for the past 14 years, has resigned for health reasons. His successor is MR. E. J. EDWARDS, who previously held the post of Assistant Chief Engineer, Operation and Administration, having previously spent ten years as station engineer of Nine Elms.

MR. G. ANNABLE, of Johannesburg, has been appointed Engineer and General Manager of the South African Lighting Association Ltd.'s gas undertaking in Grahamstown, and will be in Grahamstown to take up the appointment on December 1, 1960.

MR. P. H. BAGGOTT, technical sales engineer of Erskine, Heap & Co. Ltd., is to take charge of sales activities for the company in the Midlands. This results from the closing down of agency agreements with S. T. Pemberton & Co. Ltd., by mutual consent.

MR. J. C. CLAY, D.L., of Cowbridge, Glamorgan, and MR. F. E. PRICE, of Llanddew, Brecon, have been reappointed part-time members of the Wales Gas Board.

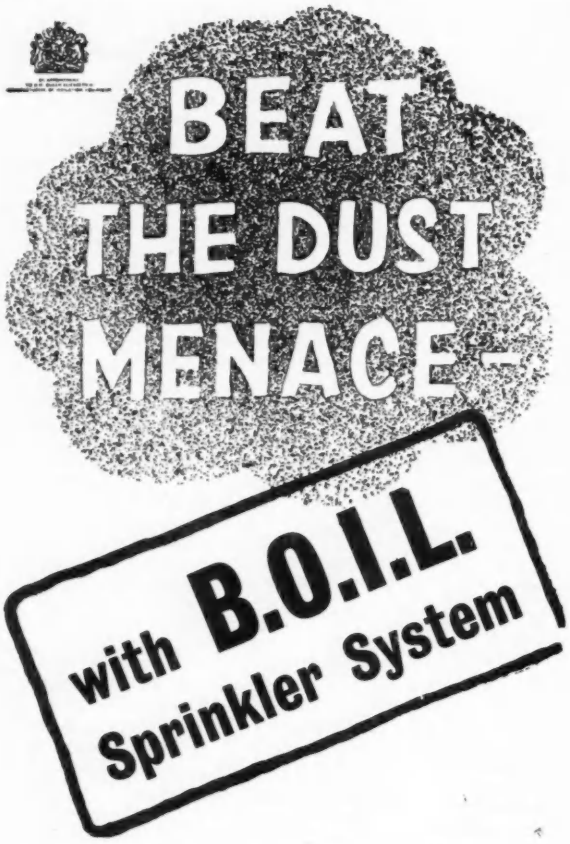
COUNCILLOR A. L. PRIOR, of East Dulwich, has been appointed a member of the South Eastern Gas Consultative Council.

MR. E. C. WOODALL, O.B.E., of London, has been re-appointed a part-time member of the Eastern Gas Board.

MR. J. JONES, of Guildford, Surrey, has been re-appointed as a part-time member of the Southern Gas Board.

OBITUARY

MR. ERIC FREER, 58-year-old director of the Staveley Iron and Chemical Co., Derbyshire, collapsed and died shortly after attending an international conference of representatives from the cast iron pipes industry in Paris. Mr. Freer's working life was spent with the Staveley company, whom he joined more than 40 years ago in the drawing office. He was appointed foundries general manager in 1954.



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